

La Paz County West Basin Water Users Study Committee

September 19, 2019

Jeff Inwood, Chief Hydrologist
Arizona Department of Water
Resources



**PROTECTING
ARIZONA'S WATER SUPPLIES
for ITS NEXT CENTURY**

Topics

- Planning Area Information
- Municipal Water Use
- Agricultural Water Use
- Hydrologic information

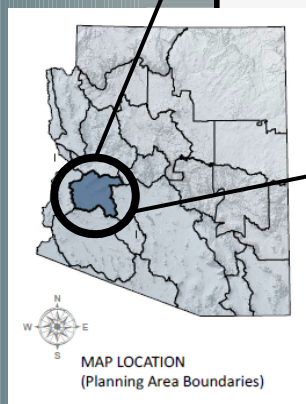
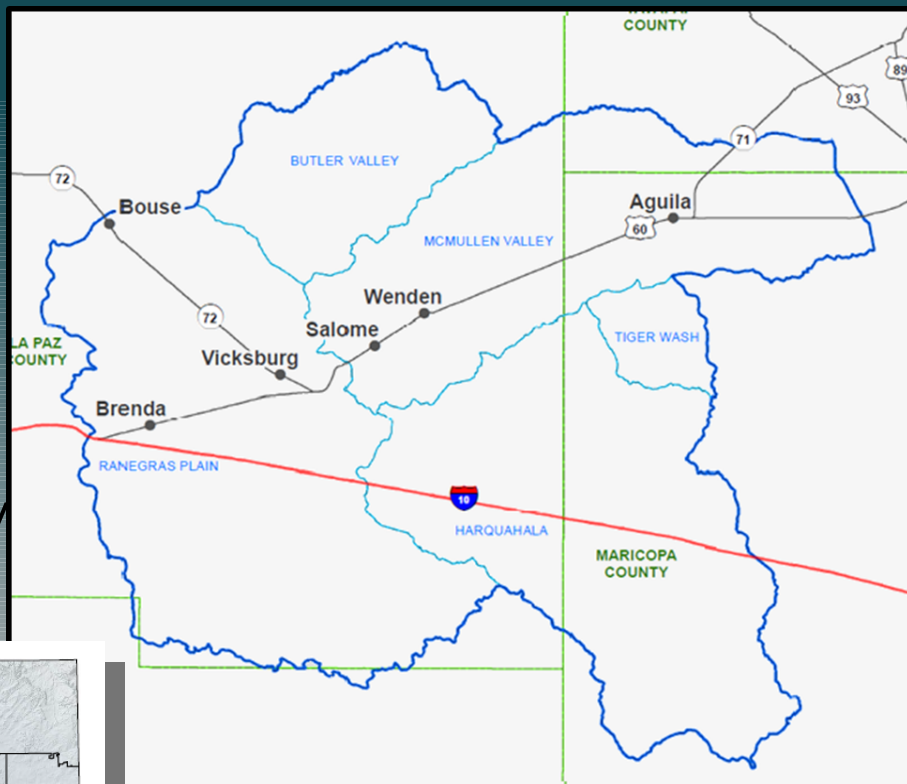
ADWR Planning Area Process



- Divides state into 22 solution-oriented Planning Areas
- Continues the work published in the Strategic Vision (2014)
- Northwest Basins, West Basins, and Cochise initial focus

West Basins Location and Composition

- **Counties:** La Paz, Maricopa, Yavapai, and Yuma
- **Groundwater Basins:** McMullen Valley, Harquahala INA, Ranegras Plain, Butler Valley, Tiger Wash
- **Communities:** Aguila, Brenda, Vicksburg, Hope, Harcuvar, Salome, Wenden, Bouse



Municipal Water Use

- Data Set

- ACC and CWS¹ data were averaged together for reporting years 2012-2015 to calculate a baseline GPCD²

- GPCD

- Baseline GPCD = 87
- GPCD was projected to remain the same

- Projection

- The projected GPCD was then applied to the 2020 US Census population projections to calculate the projected annual water use

¹ACC = Arizona Corporation Commission; CWS = Community Water Systems

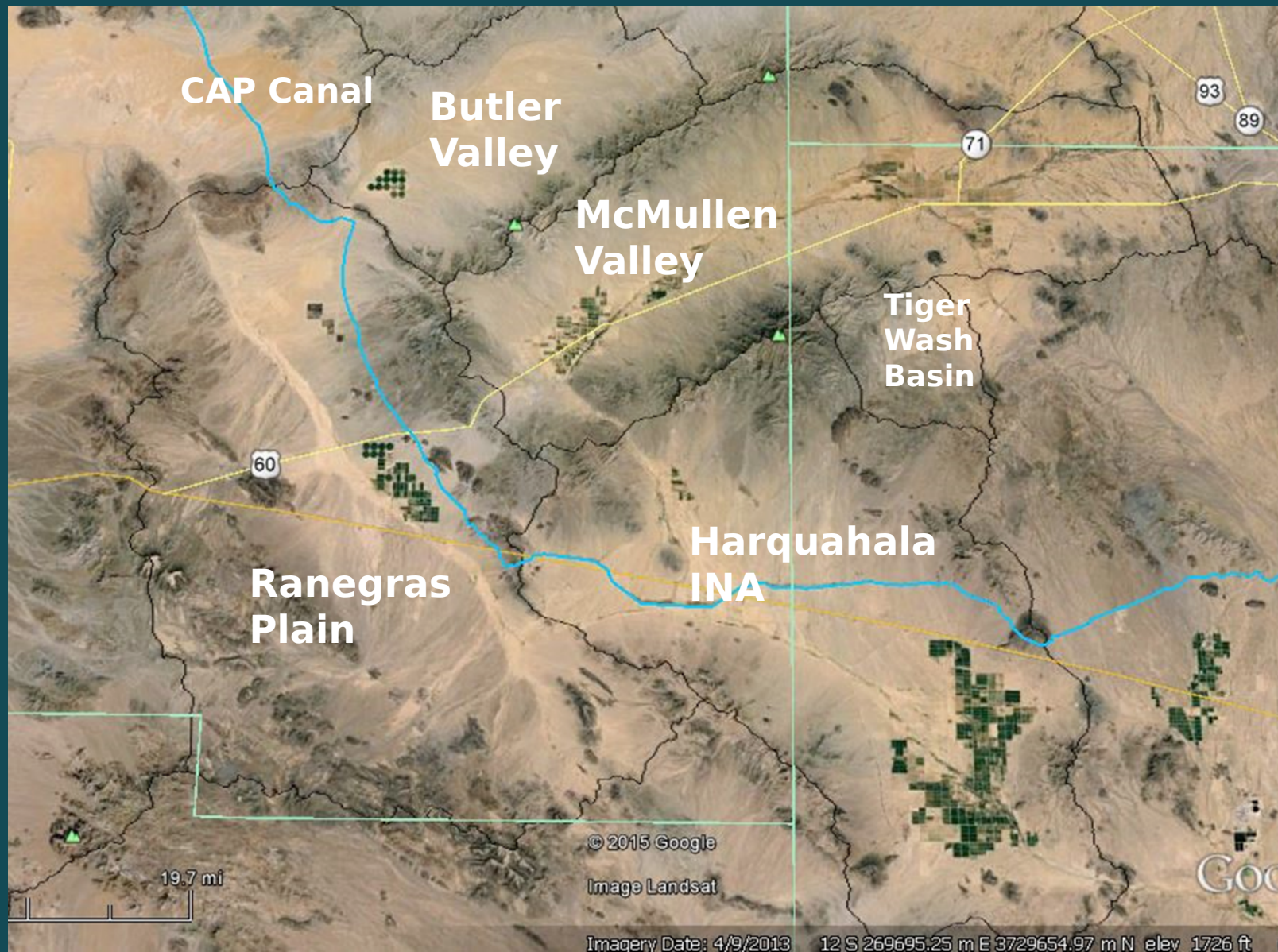
²GPCD = Gallons Per Capita Per Day

The gallons of water used by a single person in a single day

Municipal Water Use Projections for West Basins

Year	GPCD	Population	AF/Year
2010	87	6,289	612
2035	87	8,518	829
2060	87	10,957	1,066
2085	87	13,405	1,304
2110	87	15,952	1,543

Agricultural Water Use

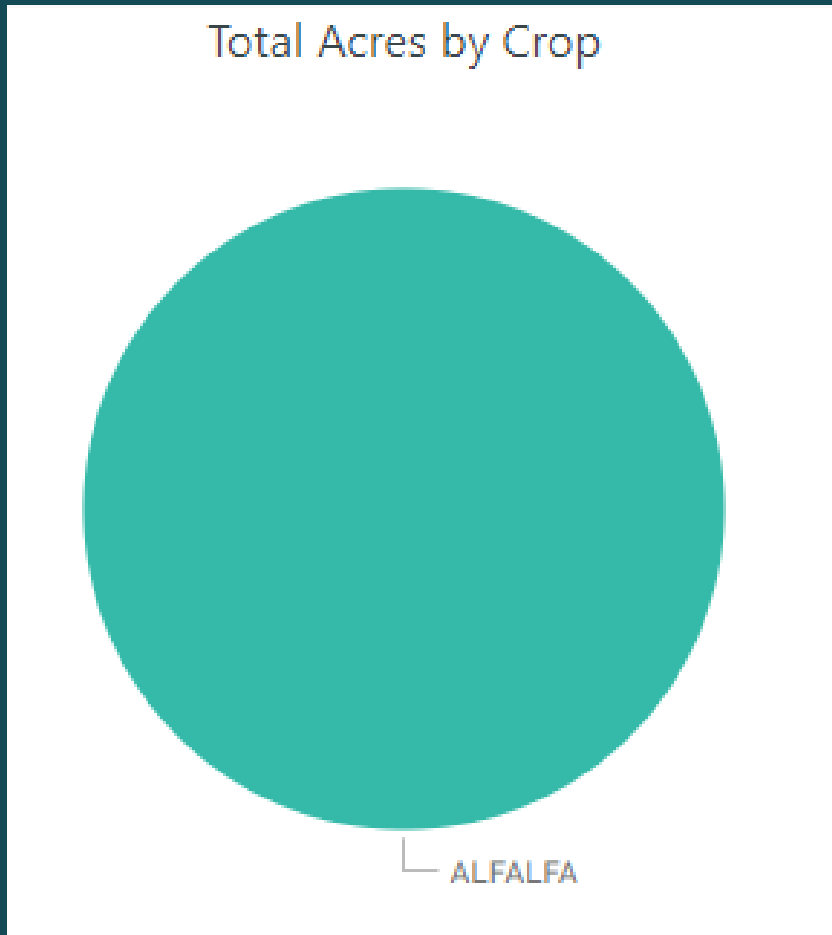


Agricultural Water Use Data Sources

- U.S. Geological Survey (USGS) – 2016 Field Verification of Groundwater Basins per ADWR request
- Groundwater basins verified in the West Basins:
 - Butler Valley
 - McMullen Valley
 - Ranegras Plain
 - Harquahala INA

2016 Estimated Cropped Acres

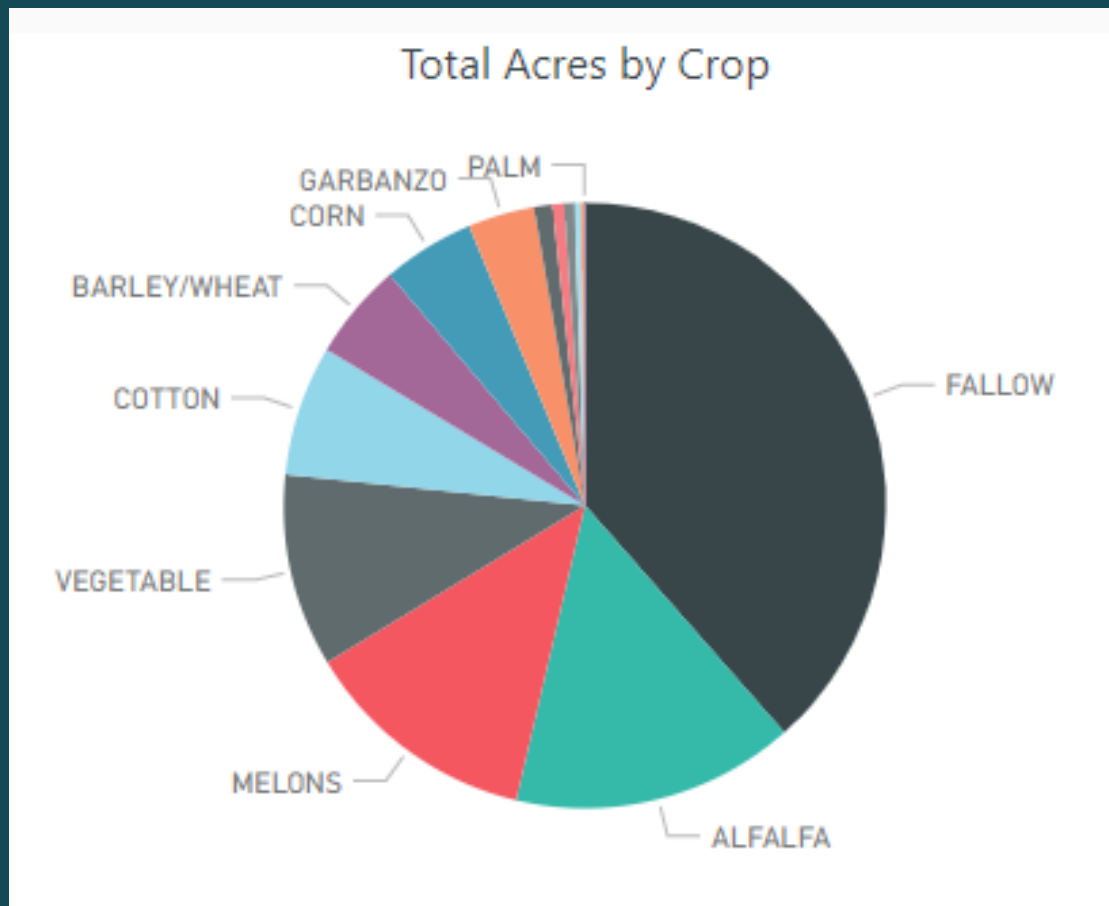
Butler Valley



Total Acres by Crop	
<u>Crop Type</u>	<u>Acres</u>
Alfalfa	1,876
<hr/>	
TOTAL	1,876

2016 Estimated Cropped Acres

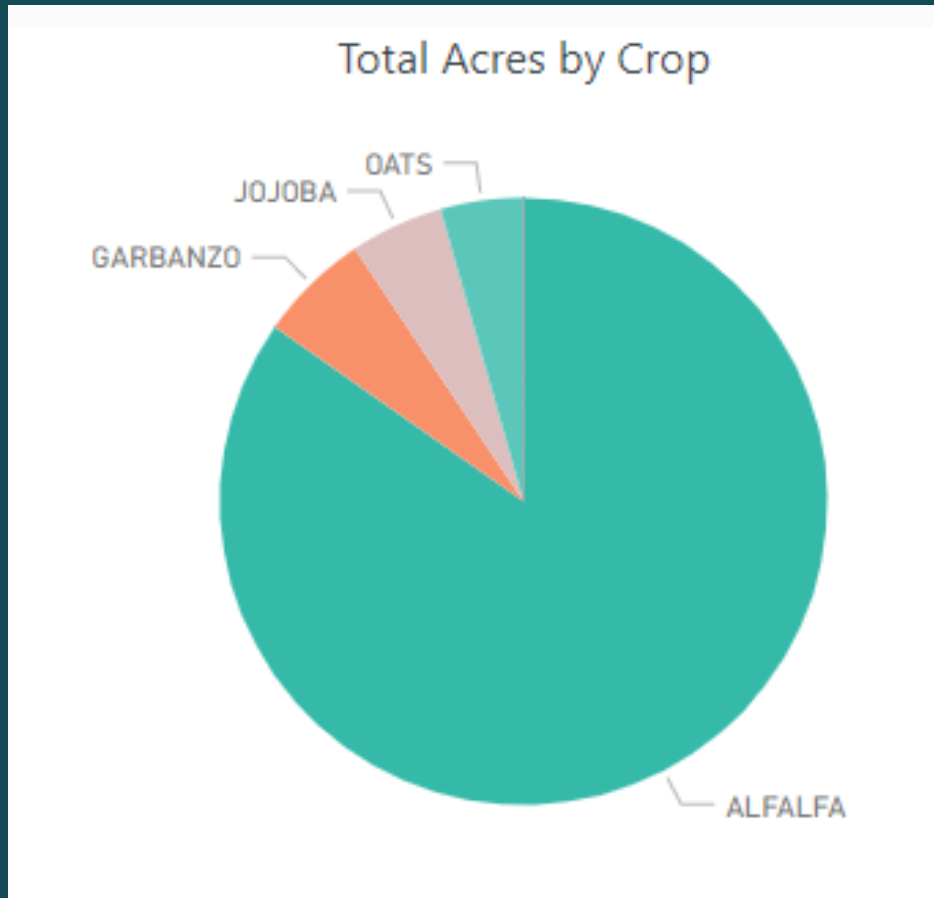
McMullen



Total Acres by Crop	
Crop Type	Acres
Alfalfa	3,543
Barley	76
Barley/Wheat	1,205
Corn	1,152
Cotton	1,627
Fallow	8,974
Garbanzo	835
Guayule	42
Melons	2,954
Palm	13
Pistachio	225
Vegetable	2,527
Young Pecans	148
TOTAL	23,321

2016 Estimated Cropped Acres

Ranegras Plain



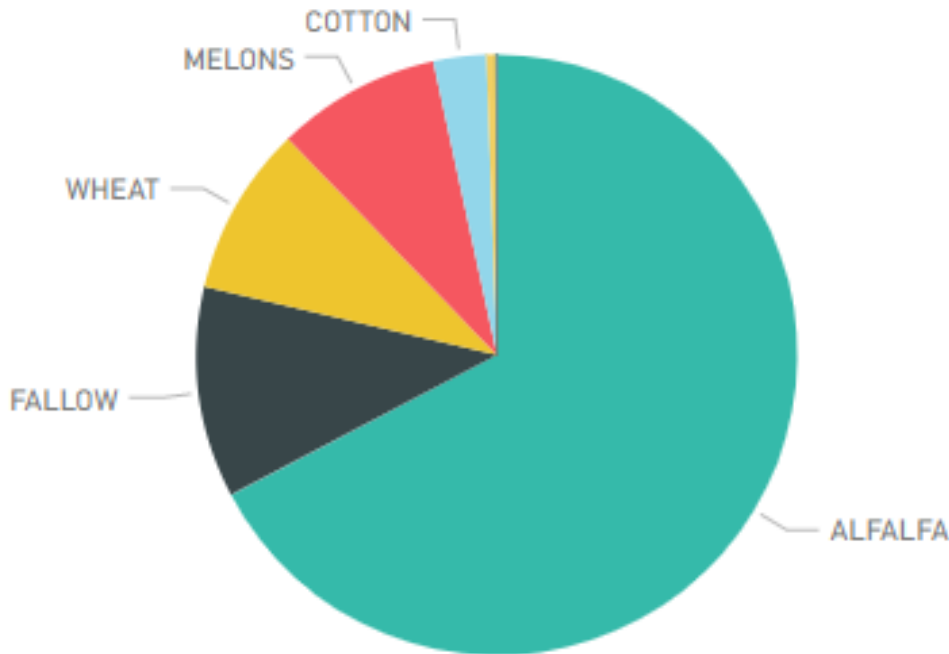
Total Acres by Crop	
Crop Type	Acres
Alfalfa	5,674
Garbanzo	395
Greenhouse	1
Jojoba	332
Oats	294
<hr/>	
TOTAL	6,696

2016 Estimated Cropped Acres

Harquahala

INLA

Total Acres by Crop



Total Acres by Crop

Crop Type	Acres
Alfalfa	18,286
Cotton	773
Fallow	3,082
Horticulture	128
Melons	2,398
Pecan	12
Pistachio	12
Wheat	2,478
TOTAL	27,169

Estimated Agricultural Demand

Basin	2004	2010	2016	2017*
Butler Valley	9,100	3,100	10,700	18,000
McMullen Valley	94,000	61,000	65,000	50,000
Ranegras Plain	27,000	27,000	41,000	38,500
Harquahala INA	79,000	121,000	150,000	129,000
Tiger Wash	0	0	0	0
TOTAL	209,100	212,100	266,700	235,500

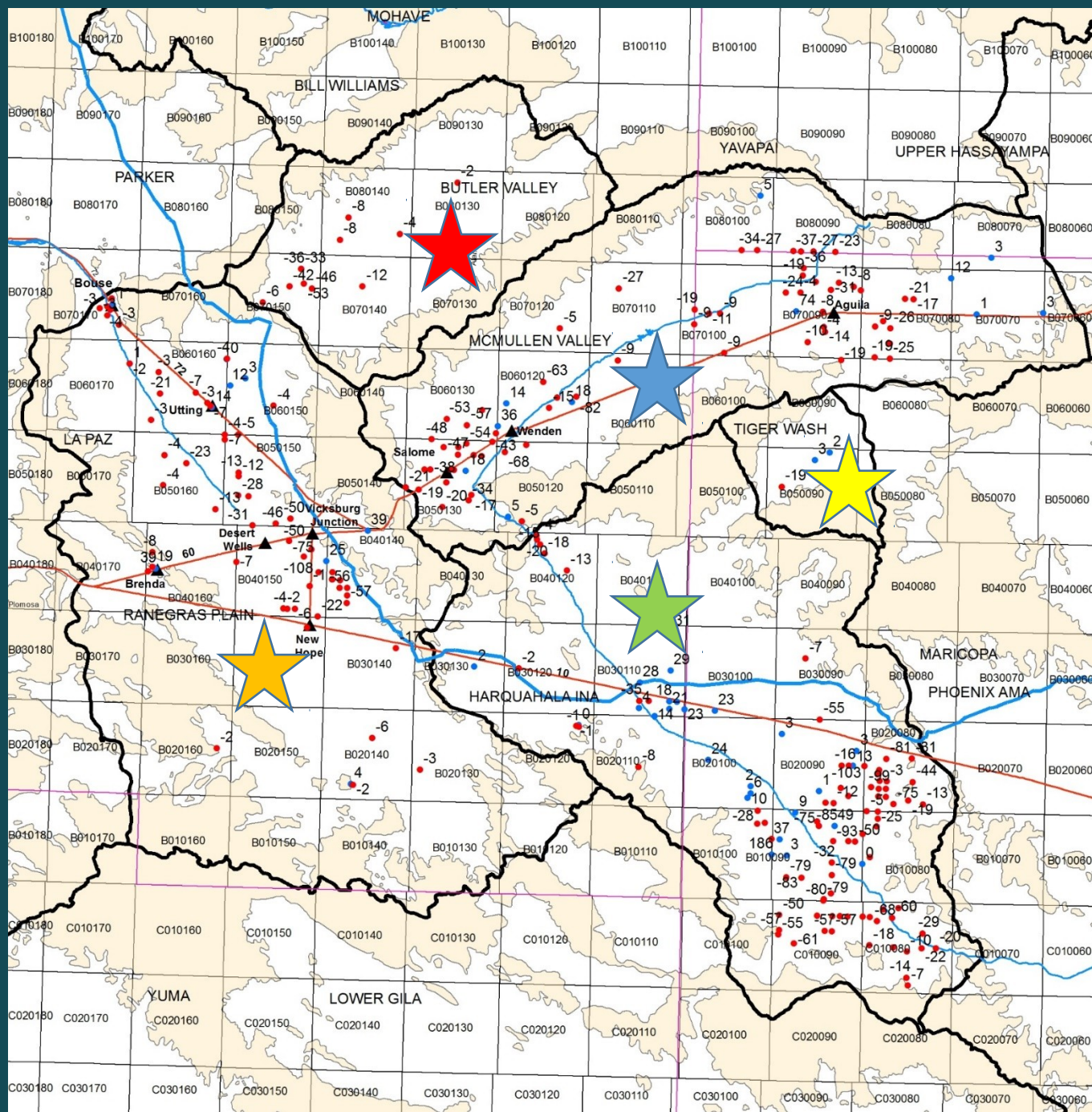
*Estimate only - no field verification

Source: USGS

All water demand values in acre-feet

Hydrologic Information

- Results of ADWR West Basins Water Level Sweep and Water Level Change
 - Conducted October 2016 through January 2017
 - Basin sweep is a concentrated effort to measure water levels in all accessible wells within a specific basin



2004 to 2016 WL Changes In the Western Basins Planning Area

! 2004 - 2016 Negative Water Level Change (Feet)

! 2004 - 2016 Positive Water Level Change (Feet)

City or Town

— CAP Canal

— River or Stream

— Highway or Road

□ Township

□ County

□ Groundwater Basin

□ Hardrock

2004 - 2016 Water Level Change Statistics For Western Basins Planning Area

(Units of Water Level Change = Feet)

(WL = Water Level)

		Basin		
		Butler Valley	McMullen Valley	Tiger Wash
Totals	All	10	76	4
	WL (-)	10	65	1
	WL (#)	0	11	3
Negative (-) WL Change	Min	-23	-3.9	-18.6
	Max	-53.3	-85.6	-18.6
	Avg	-21.7	-30.0	-18.6
Positive (+) WL Change	Min	NA	11	16
	Max	NA	73.6	28
	Avg	NA	16.9	24

2004 - 2016 Water Level Change Statistics For Western Basins Planning Area

(Units of Water Level Change = Feet)
(WL = Water Level)

		Basin	
		Renegras Plain	Harquahala INA
Totals	All	68	107
	WL (-)	57	81
	WL (#)	11	26
Negative (-) WL Change	Min	-1.3	-0.6
	Max	-135.0	-213.7
	Avg	-23.9	-54.2
Positive (+) WL Change	Min	0.1	0.3
	Max	39.0	186.2
	Avg	14.3	21.5

2004 - 2016 Water Level Change Statistics For Western Basins Planning Area

(Units of Water Level Change = Feet)

(WL = Water Level)

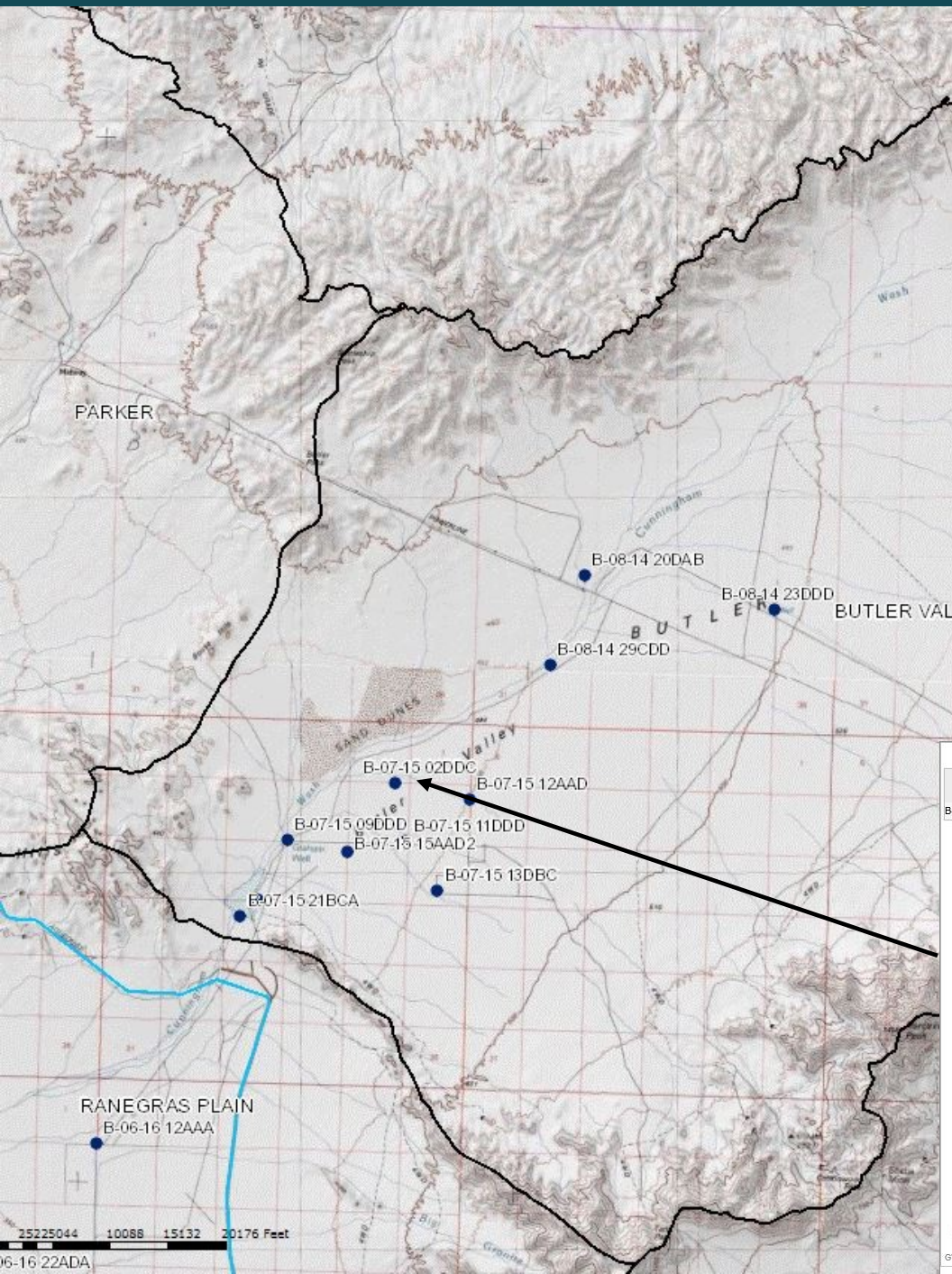
		Basin					
		Butler Valley	McMullen Valley	Tiger Wash	Renegras Plain	Harquahala INA	West Basins PA
Totals	All	10	76	4	68	107	265
	WL (-)	10	65	1	57	81	214
	WL (#)	0	11	3	11	26	51
Negative (-) WL Change	Min	-2.3	-3.9	-18.6	-1.3	-0.6	-0.6
	Max	-53.3	-85.6	-18.6	-135.0	-213.7	-213.7
	Avg	-21.7	-30.0	-18.6	-23.9	-54.2	-37.1
Positive (+) WL Change	Min	NA	1.1	1.6	0.1	0.3	0.1
	Max	NA	73.6	2.8	39.0	186.2	186.2
	Avg	NA	16.9	2.4	14.3	21.5	17.9

Hydrologic Information

- Example Index Well Hydrographs

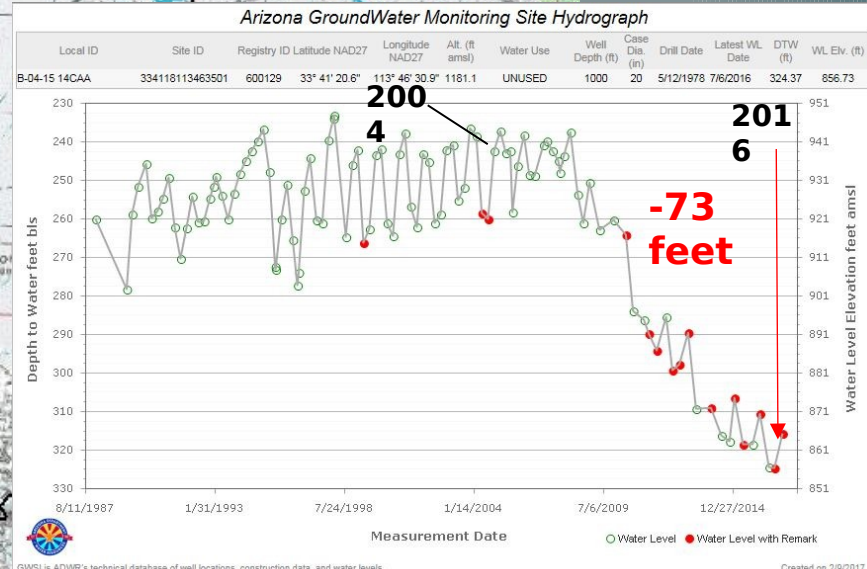
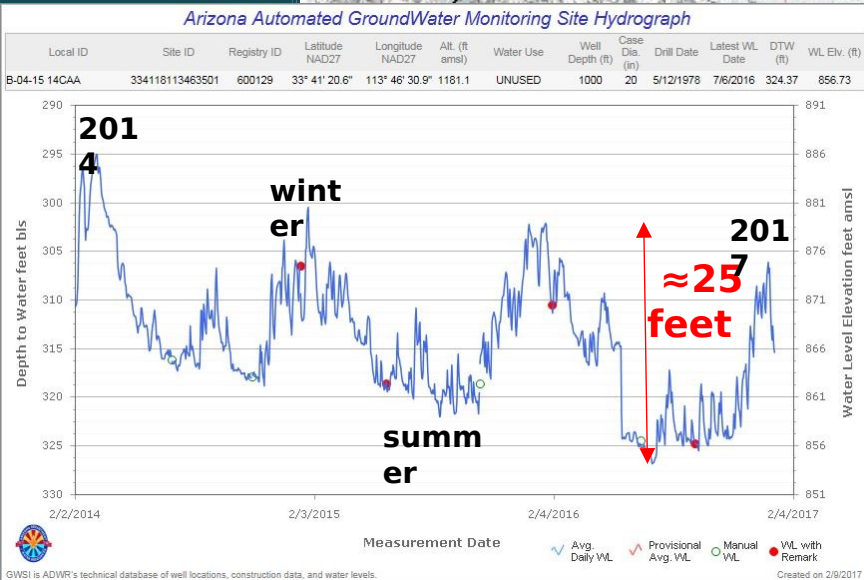
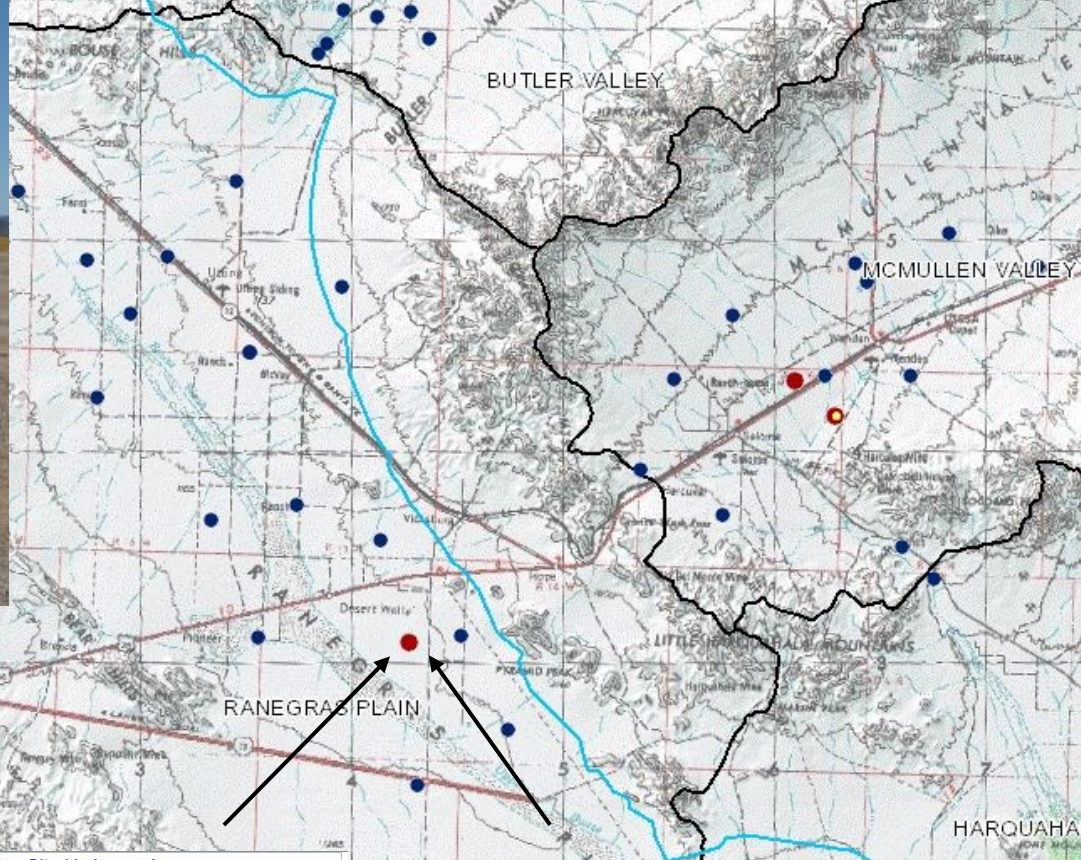
- Index wells are a group of wells that are measured by ADWR annually, semiannually, or quarterly by ADWR Field Services staff
- Approximately 1,800 index wells statewide
- Water level measurements are recorded in ADWR's Groundwater Site Inventory (GWSI) database
- Automated sites – pressure transducers installed that collect water level measurements at set interval (once a day, every second, one a month, etc.)
- 130 installed automated sites statewide

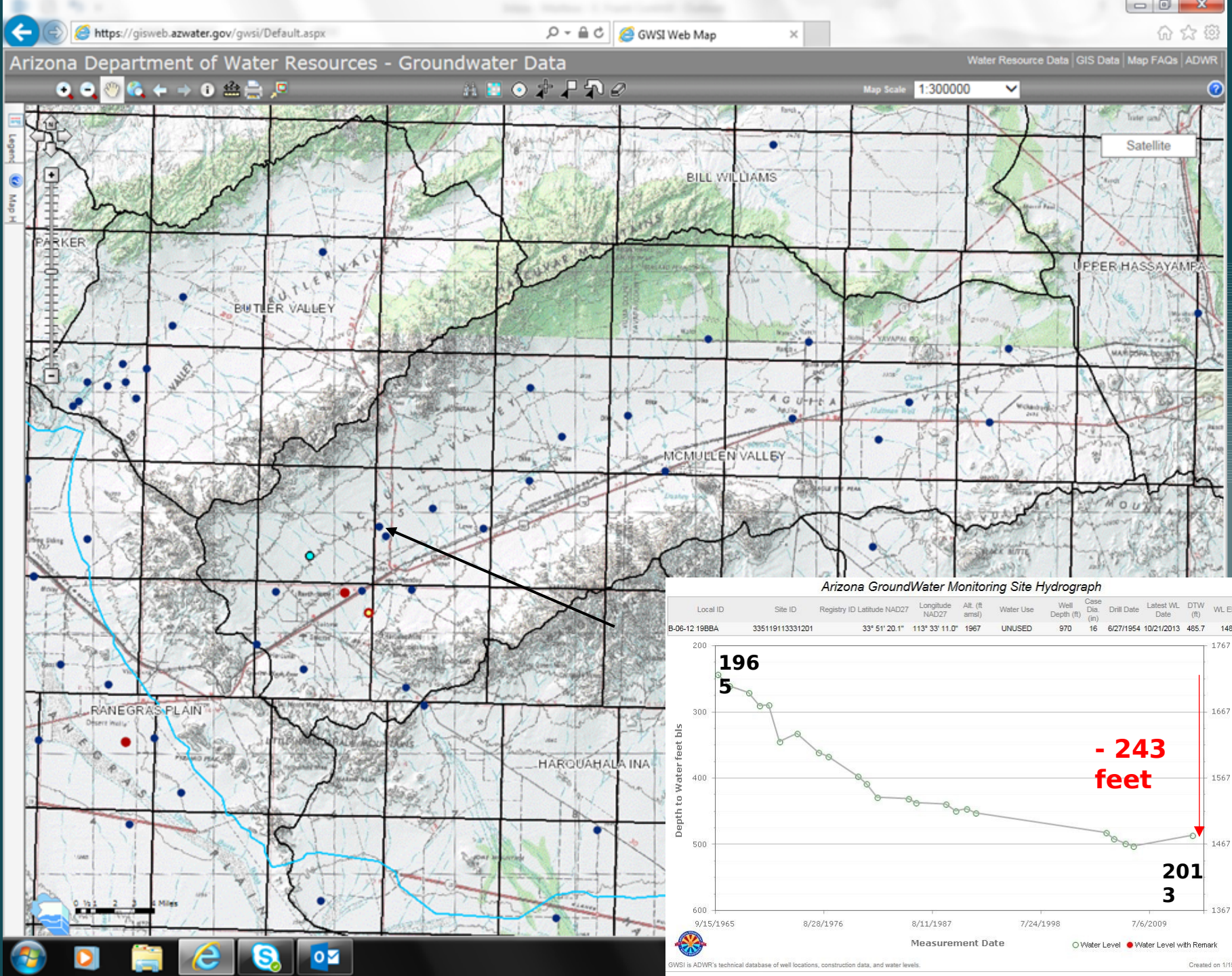
- “Dry” well measurements

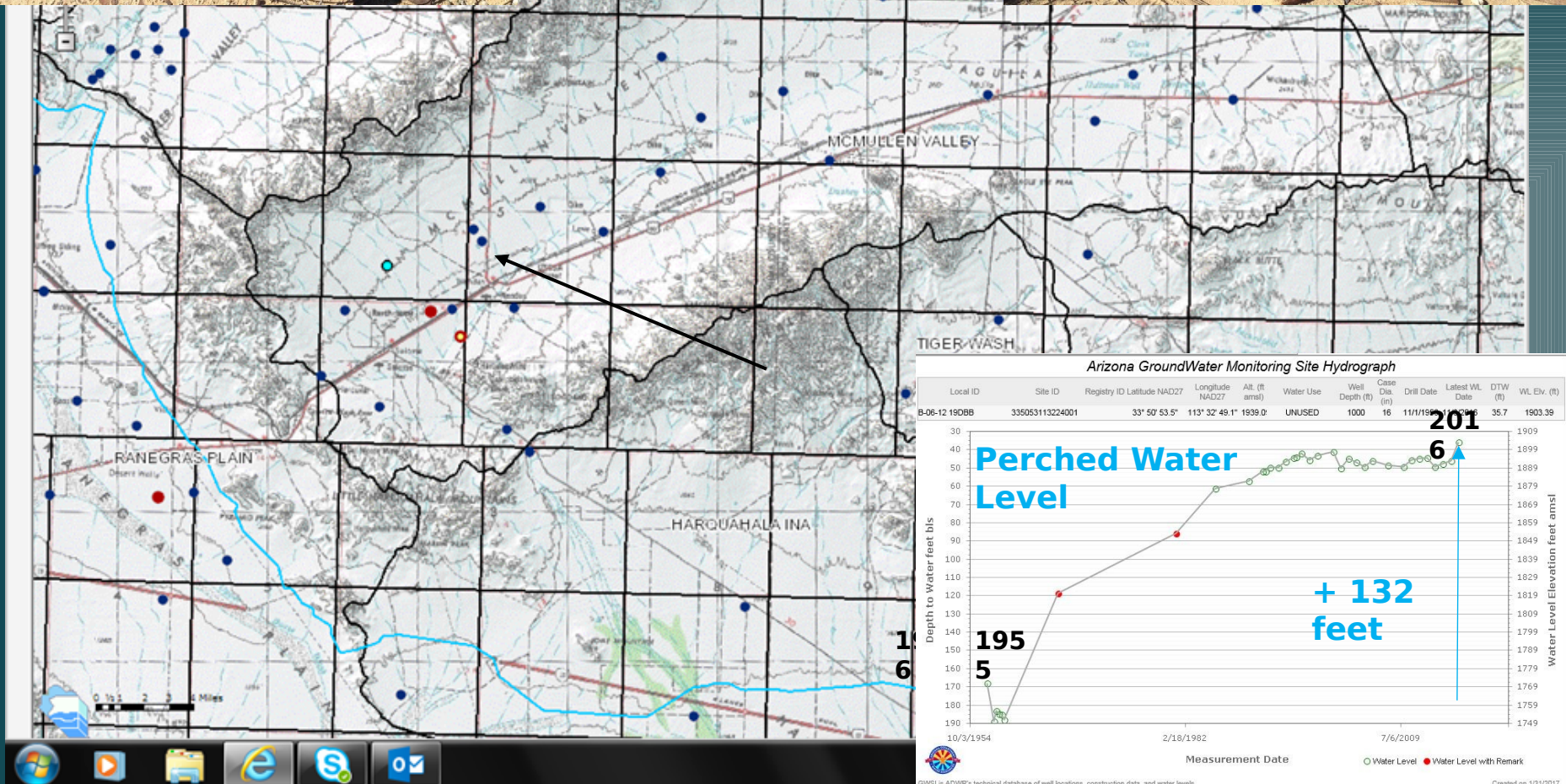
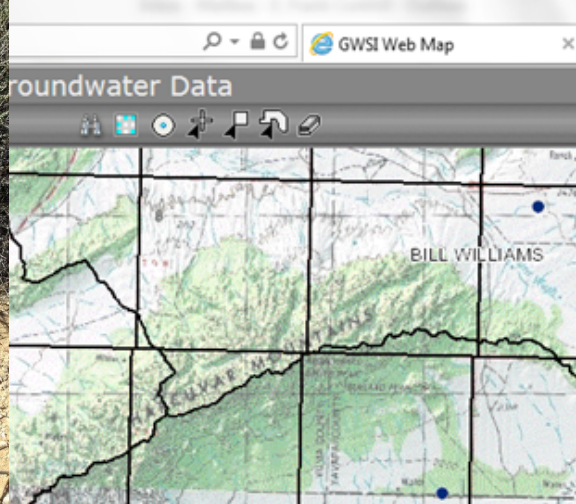


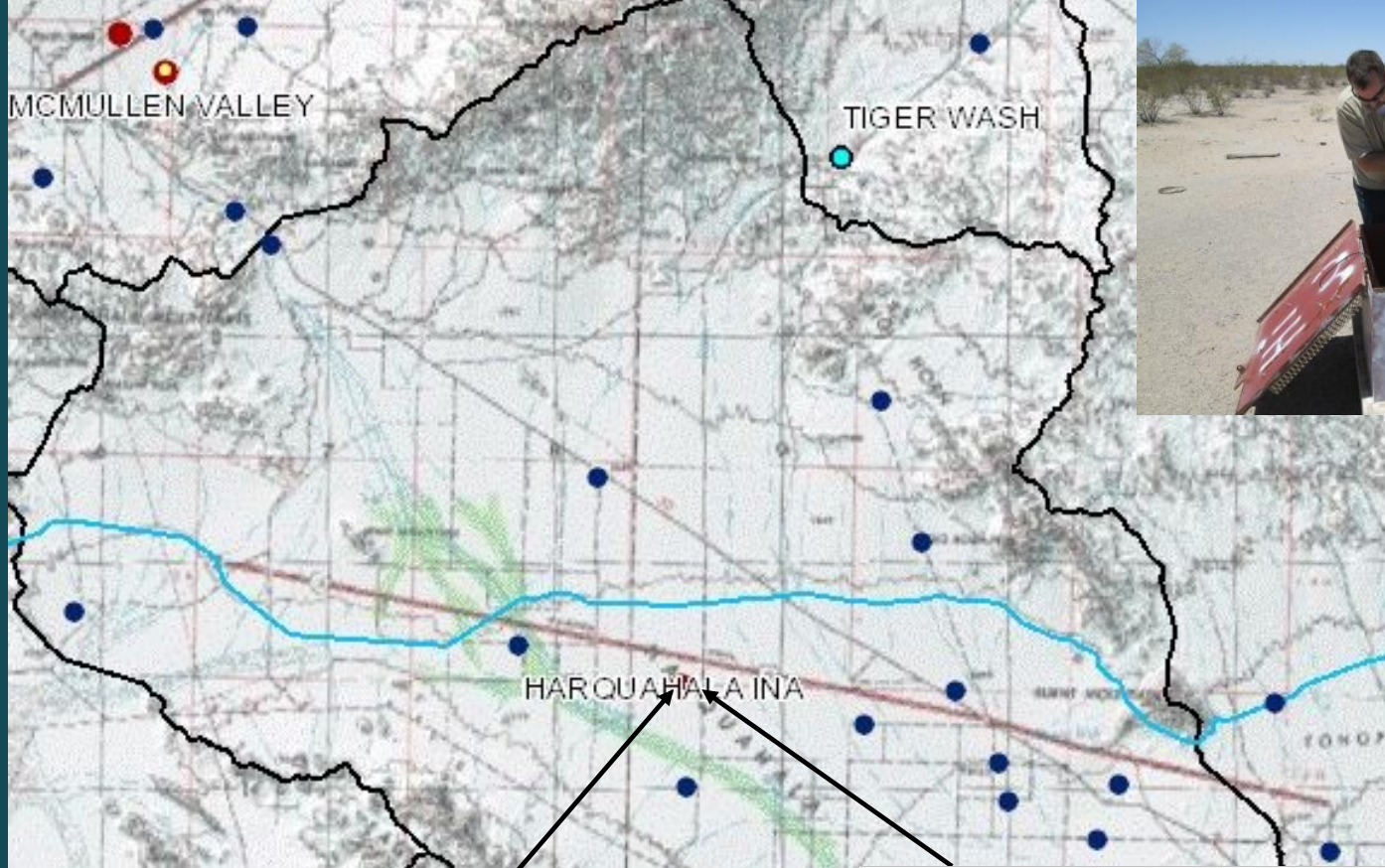
Arizona GroundWater Monitoring Site Hydrograph



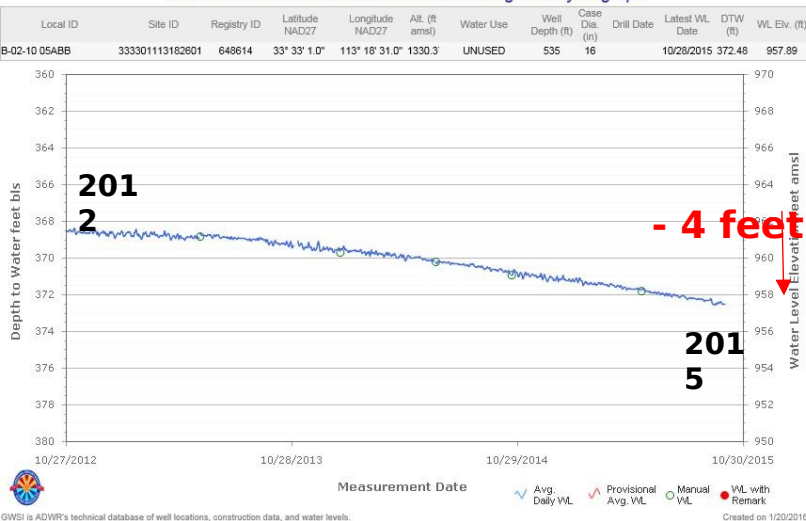




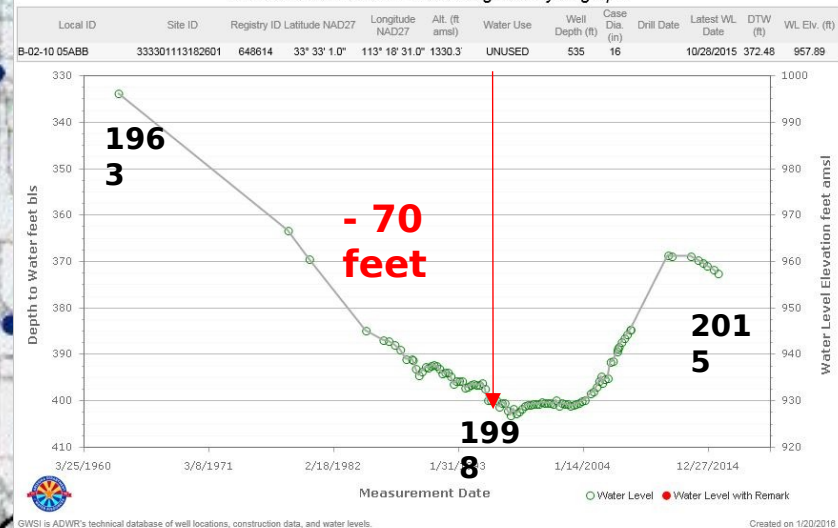


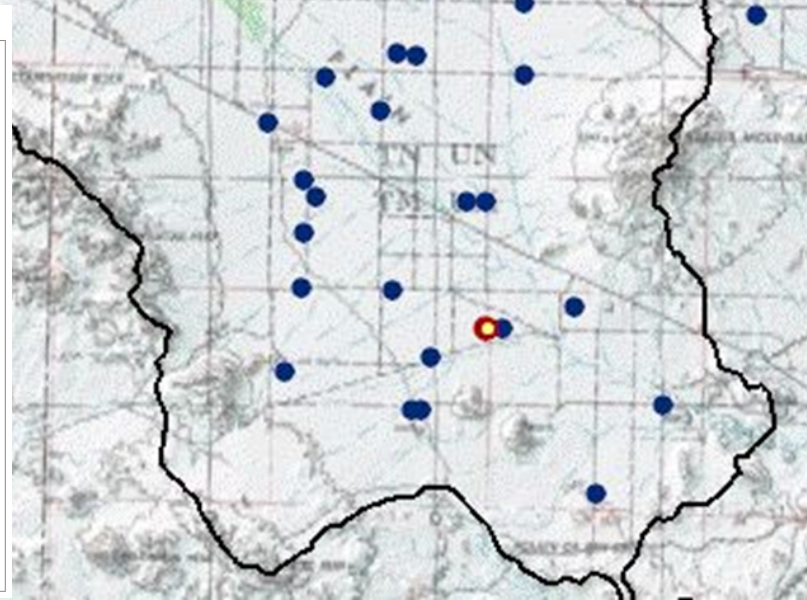
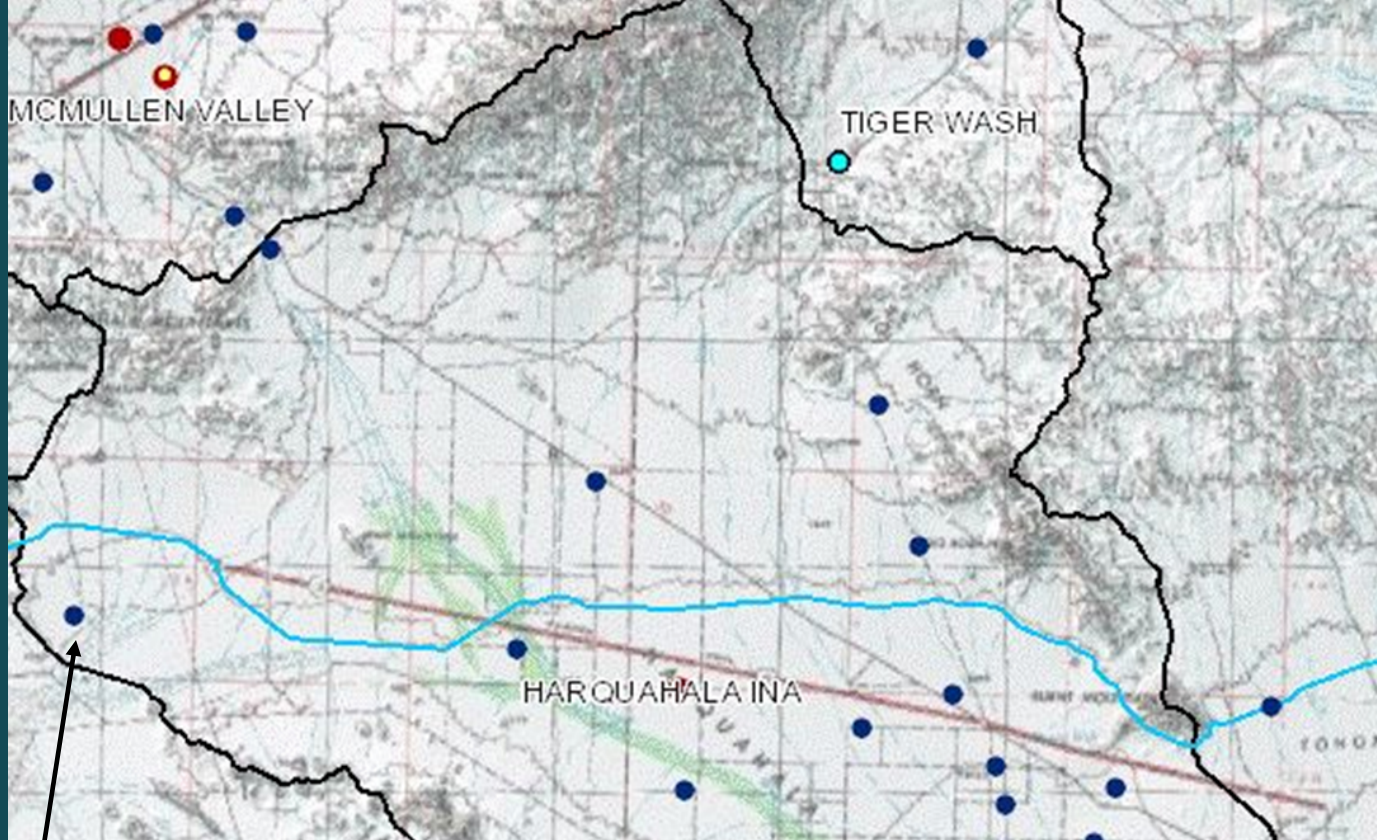


Arizona Automated GroundWater Monitoring Site Hydrograph



Arizona GroundWater Monitoring Site Hydrograph





Wells Going “Dry”

- Count of dry wells (no observed water level at time of measurement)
 - Butler Valley: 5
 - McMullen Valley: 7
 - Renegras Plain: 7
 - Harquahala INA: 7
 - Most results from 2016 Basin Sweep; 2 recorded in 2013



CURRENT INITIATIVES

Governor's Water
Augmentation, Innovation and
Conservation Council
Public Notice: Arizona Intrastate
Process for ICS Projects



EVENTS & MEETINGS

Public Meetings
Lower Basin Drought
Contingency Planning
Recovery Planning Advisory
Group



WELL RESOURCES

Well Forms
Well Drillers
How to Find my Well Video
Online Driller's Log
Report Dry Well Data



DATA CENTER

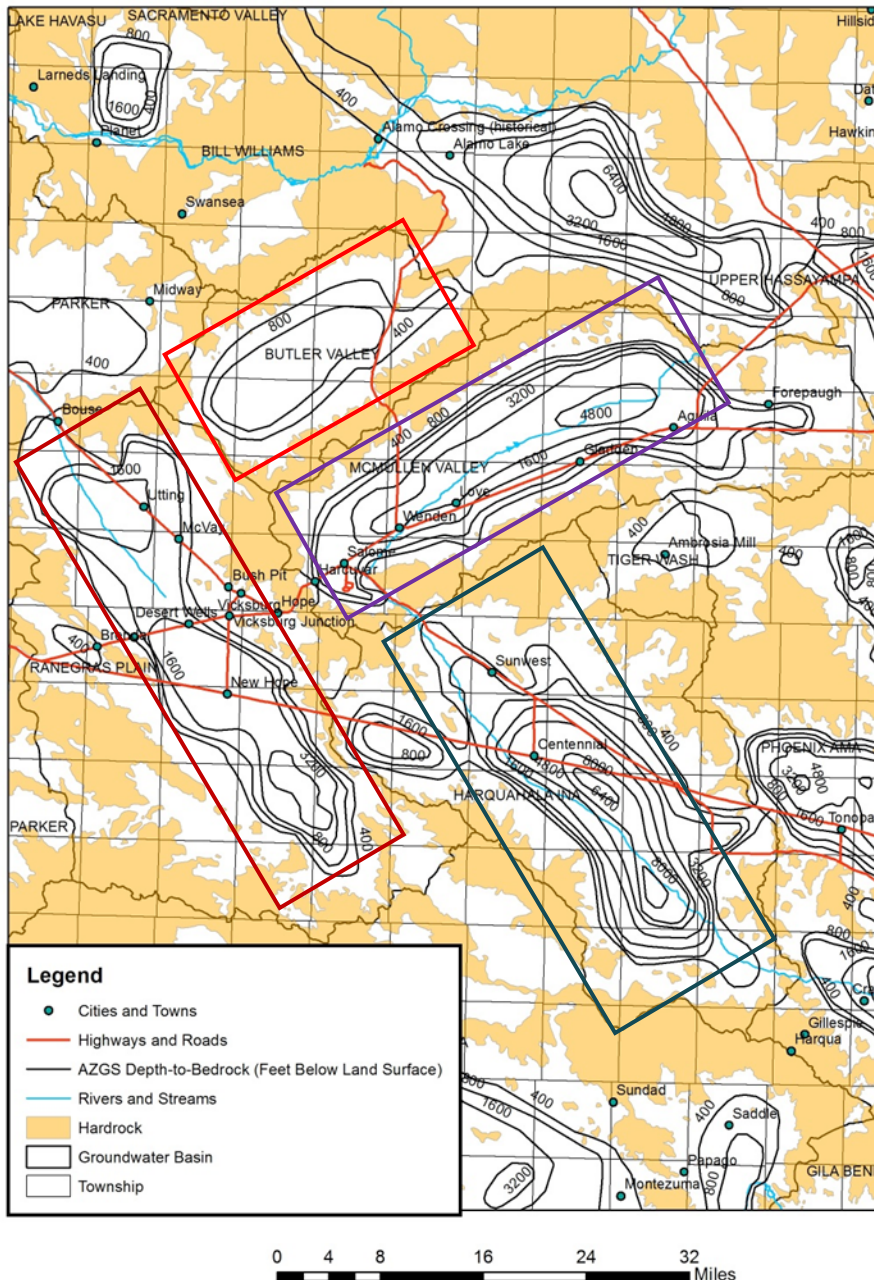
ADWR Reports
GIS Data
Imaged Records
Live Queries and Reports
Public Records Request



Hydrologic Information

- Arizona Geological Survey (AZGS) Depth to Bedrock
- Groundwater in Storage
 - Source: ADWR Strategic Vision

Depth-to Bedrock in Western Arizona Groundwater Basins



Depth to Bedrock

Butler Valley:
> 800 feet bgs

Renegras:
> 1,600 feet bgs Northern
portion
> 3,200 feet bgs Southern
portion

McMullen Valley:
> 4,800 feet bgs Northeastern
portion

Harquahala:
> 8,000 feet bgs Southern
portion
> 6,400 feet bgs Central
portion

Groundwater in Storage

Estimated Groundwater In Storage (million acre-feet)

Basin				
Butler Valley	McMullen Valley	Ranegras Plain	Harquahala INA	Tiger Wash
6.4	15.1	9.0	15.5	0.7

Storage estimates to 1,200 feet below ground surface

Source: Arizona Water Atlas, 2010

Questions?

Jeff Inwood
Chief Hydrologist

Phone: 602.771.
jinwood@azwater.gov

www.azwater.gov



PROTECTING
ARIZONA'S WATER SUPPLIES
for ITS NEXT CENTURY